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Implementing Fault Location Algorithms in Python

Project type:	☐ Semester project	☐ MSc thesis	☒ Internship
Project responsible (email):	mayank.nagendran@zaphiro.ch		

Project description and objectives:

Zaphiro uses different algorithms for faulted area identification and fault distance estimation based on the type of grids and types of faults. Zaphiro's algorithms are based on power system protection principles such as differential, directional and distance relaying and they are adapted to include PMUs.

The objective of this project is to continue the migration of the tools used by our R&D team towards pandapower, an open-source tool for power system modelling, analysis and optimization. The choice of pandapower is mainly driven by its relatively large user base and the support for importing the network via CGMES files.

Tasks:

Implement and test the following:

- An algorithm to divide the grid into smaller regions based on the position of sensors
- Algorithm for fault detection
- Algorithm for fault classification
- Algorithm for fault distance estimation

Required skills:

- Strong understanding of distribution grids, especially fault analysis
- Knowledge of Python and Matlab is required, knowledge of go is a plus
- Knowledge of Pandapower and/or CGMES is a plus

Other benefits and/or compensation:

About Zaphiro:

Zaphiro is an innovative smart grid company based in Lausanne, Switzerland, and Milan, Italy, that was founded in 2017 as a spin-off from EPFL and is backed by well renowned international groups such as ABB and CDP Ventures.
Our product, SynchroGuard, is the first distribution grid monitoring & automation system based on D-PMU (Distribution-Phasor Measurement Unit) technology, specifically designed to easily retrofit distribution substations and integrate with existing control room solutions (e.g., SCADA, DMS). SynchroGuard helps utilities increase grid observability, particularly in presence of high DER penetration, and improve grid resiliency by reducing the impact of blackouts on their consumers.